

APPLICATION  
FOR  
UNITED STATES OF AMERICA

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SPECIFICATION

TO ALL WHOM IT MAY CONCERN:

Be it known that We,

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and

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have invented certain improvements in

“SPORTS SHOE”

of which the following description in connection with the accompanying drawings is a specification, like reference characters on the drawings indicating like parts in the several figures.

## BACKGROUND OF THE INVENTION

The present invention relates to a sports shoe such as for example a ski boot, or a roller skate, or an ice skate.

Sports shoes are currently in use which are usually provided with a sole, 5 with which a rigid or semirigid shell for containing the foot of the user is associated in an upward region.

A quarter is typically rotatably associated at the malleolar region and wraps around at least the lower portion of the leg.

Some sports shoes have a shell that is divided into a heel unit and a 10 separate toe unit, so as to allow to adjust the length of the shoe.

For example, Swiss patent no. 611,495 is known that discloses a ski boot comprising a shell constituted by two separate parts that can slide on each other along a longitudinal axis.

The sliding interconnection between the two parts, i.e., between the heel 15 unit and the toe unit of the shell, is ensured, proximate to the upper metatarsal region, by the presence of an extension that protrudes to the rear from the edge of the toe unit, so as to interact slidingly in a complementarily shaped seat provided proximate to the front edge of the heel unit.

At the lower surfaces of the toe unit and heel unit, their mutual sliding 20 interconnection is achieved by arranging three pins, which protrude upward from the lower surface of the heel unit, in respective slots provided longitudinally in the lower surface of the toe unit.

In this manner, by moving the toe unit further forward with respect to the heel unit, a corresponding increase in the length of the shoe is achieved.

25 The main drawback of this known type of sports shoe consists in that it allows to change the dimensions of the shoe only in a longitudinal direction.

However, a larger shoe size usually entails also an increase in the overall volume of the shoe, therefore both lengthwise and widthwise, and not only an increase in length.

30 Accordingly, an important drawback of these known types of sports shoe

relates to the fact that they allow a comfortable fit only to users that have a preset foot size.

Another important drawback consists in that the prolonged use of a sports shoe that is excessively tight, for example in the metatarsal region, 5 can cause a slowing in blood circulation, with consequent difficulty for the body to keep the foot warm.

In general, the known types of shoe cited above are difficult to adapt to the specific shape of the foot of the user, allowing comfortable use only at a specific size and thus compromising the possibility to fit feet of different 10 sizes in the same shoes.

#### SUMMARY OF THE INVENTION

The aim of the present invention is therefore to solve the noted problems, eliminating the drawbacks of the cited known art, by providing a sports shoe that allows, as the size varies, an optimum adaptation of the 15 overall volume of the shoe to the foot of the user.

Within this aim, an object of the present invention is to provide a sports shoe that allows to ensure maximum comfort of the user regardless of the dimensions of his foot, provided that they are within the size range covered by such shoe.

20 Another object of the present invention is to provide a sports shoe that wraps around the foot so as to allow optimum blood circulation, therefore allowing the user to practice the sport in the best possible physical conditions.

Another object of the present invention is to provide a sports shoe that is 25 structurally simple and has low manufacturing costs.

This aim and these and other objects that will become better apparent hereinafter are achieved by a sports shoe that comprises a sole that is rigidly associated with an upper shell that is divided into a heel unit and a separate toe unit, characterized in that it comprises adjusting means for increasing 30 the overall volume of said sports shoe by means of a forward movement of

said toe unit.

### BRIEF DESCRIPTION OF THE DRAWINGS

Further characteristics and advantages of the invention will become better apparent from the detailed description of an embodiment of the sports shoe according to the present invention, illustrated by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is a partially sectional side view of a possible embodiment of the sports shoe according to the present invention;

Figures 2 and 3 are partially sectional plan views of the sports shoe of Figure 1, arranged in two different configurations, respectively with a small size and a large size.

In the examples of embodiments that follow, individual characteristics, given in relation to specific examples, may actually be interchanged with other different characteristics that exist in other examples of embodiment.

### 15 DESCRIPTION OF THE PREFERRED EMBODIMENTS

With reference to the figures, the reference numeral 1 designates a sports shoe, such as for example a ski boot.

Sports shoe 1 comprises a sole 2 that is monolithically associated with an upper shell 3, with which a quarter 4 that wraps around the lower part of the leg of the user is rotatably associated approximately at the malleolar region.

In the embodiment illustrated herein, the shell 3 is divided into a heel unit 5 and a separate toe unit 6, which partially overlap each other approximately at the metatarsal region of the foot.

The toe unit 6, constituted by a box-like body that is open at the rear and wraps around the tip of the foot of the user, has a first lower surface 7 in which there is, approximately along its longitudinal central axis, an approximately wedge-shaped slit 8.

Slit 8 affects i.e. extends at least the region where said toe unit 6 and said heel unit 5 overlap, and preferably lies between the rear edge of the first lower surface 7 and the toe region of said surface.

In this manner, the slit 8 forms, on said first lower surface 7, two flat wings 9a and 9b, which are connected each other proximate to the toe region.

Two first slots, respectively designated by the reference numerals 10a and 10b, are formed in the two wings 9a and 9b and are obtained along two directions that diverge toward the toe region.

Two protrusions 11a and 11b can be arranged in said two slots 10a and 10b and protrude upward from a second lower surface, designated by the reference numeral 12, of said heel unit 5.

Proximate to the toe region there are also two second slots 13 and third slots 14, which are formed respectively in the first lower surface 7 and in the second lower surface 12.

Said first and second slots 13 and 14, provided along axes that are approximately parallel to the longitudinal central axis of the shoe, approximately mutually overlap in pairs, and are connected in a downward region to two respective holes, generally designated by the reference numeral 15, formed in the sole 2.

In particular, in the example shown in Figure 1, said holes 15 are formed approximately at right angles in a standardized toe block 16 that is associated with the toe unit 6 in a downward region.

The second slots 13 have, in a downward region, a perimetric tang 13a for supporting for example a threaded nut, not shown, which is suitable to interact with a complementarily threaded screw, also not shown, which is arranged coaxially to the hole 15.

The nut and the screw, whose head abuts against a recess 17 formed in a downward region with respect to the toe block 16, constitute means for temporarily locking the mutual sliding of the heel unit 5 and the toe unit 6.

In this manner, the first slots 10a and 10b, and the second and third slots 13 and 14, by interacting respectively with the protrusions 11a and 11b and with the stem of said screws, constitute elements for the mutual engagement

and sliding of the toe unit 6 and the heel unit 5.

At the same time, the inclination with which said first slots 10a and 10b are provided, as well as the presence of the slit 8, allow a gradual increase of the width of said heel unit 5 when the toe unit 6 is moved forward.

5 Figures 2 and 3 illustrate the two extreme positions, respectively at the minimum size and at the maximum size, of the shoe 1; such figures show that the divarication of the pair of wings 9a and 9b forces an equal divarication of the elastically deformable sides of the heel unit 5, at least proximate to the region of overlap with the toe unit 6.

10 It is therefore evident that the first slots 10a and 10b, together with two wings 9a and 9b, constitute adjusting means for varying the overall volume of the sports shoe by moving forward the toe unit 6 with respect to the heel unit 5.

15 Use of the sports shoe is therefore as follows: with reference to Figure 1, in order to achieve size adjustment the user has to act on the locking screws, not shown, by unscrewing them partially, so as to allow mutual sliding of the heel unit and toe unit.

20 During this sliding, the movement of the protrusions along the first slots entails a divarication or a mutual approach of the two wings of the lower surface of the toe unit, accordingly entailing a variation of the width of the shoe.

In this manner, when the shoe is lengthened it also widens proportionally, and vice versa.

Once the selected adjustment has been performed, the user can retighten 25 the screws on the nuts.

It has thus been found that the invention has achieved the intended aim and objects, a sports shoe having been devised which allows to provide, as the size varies, optimum adaptation of said shoe to the foot of the user.

The invention in fact allows to adjust simultaneously both the length and 30 the width of the shoe, so as to vary its overall volume, ensuring a

comfortable condition to the user regardless of the size selected.

The sports shoe therefore allows optimum blood circulation, allowing the user to ski always in the best physical conditions.

Adjustment occurs simply and rapidly, and it is optionally possible to 5 associate a graduated device for visualizing the adjustment made with the elements for mutual engagement and sliding between the heel unit and the toe unit.

The invention is of course susceptible of numerous modifications and variations, all of which are within the scope of the appended claims.

10 Thus, for example, it is possible to provide a sports shoe in which the first slots 10a, 10b are provided in the lower surface 7 of the heel unit 5 and the protrusions 11a, 11b protrude below the lower surface of the toe unit 6.

15 As an alternative to the provision of the first slots, it is possible to provide in the lower surface of the heel unit a pair of slots that diverge appropriately toward the toe region.

Another embodiment provides for two or more slits along the lower surface of the toe unit; as an alternative, one might provide a toe unit that has a lower surface at least partially made of elastically deformable material.

20 The materials used, as well as the dimensions that constitute the individual components of the invention, may of course be more pertinent according to specific requirements.

25 The various means set forth in the above description for performing certain different functions need not certainly coexist only in the illustrated embodiment but can be present *per se* in different shoe embodiments, with size adaptation provisions.

The disclosures in Italian Patent Application No. TV2002A000149 from which this application claims priority are incorporated herein by reference.